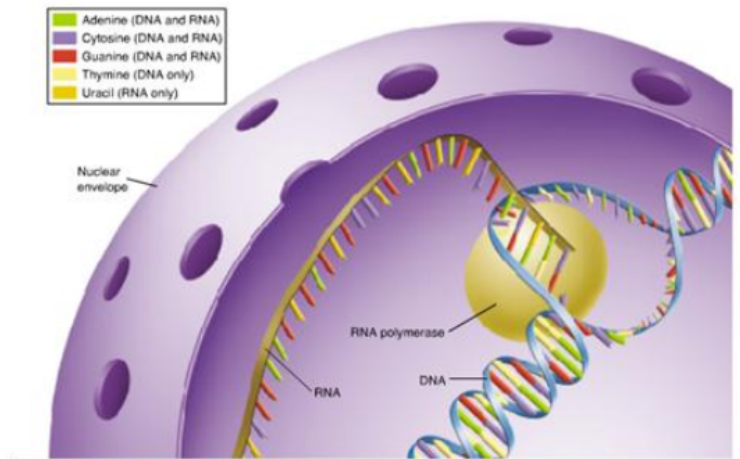


Chapter 12-3 Protein Synthesis: Making proteins through Transcription and Translation



Let's Review

What does DNA stand for?

What is the function of DNA?

What is the structure of DNA?

What are the bases in DNA?



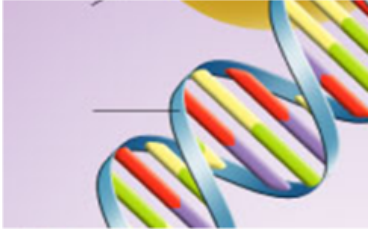
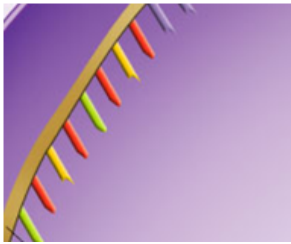
What is DNA Replication?

What is the base-pairing rule for DNA?

Replicate the three DNA strands on "Breaking the Code"

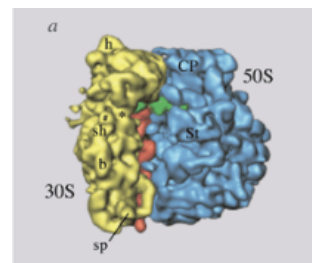
RNA is a nucleic acid that makes proteins using the instructions from DNA

How is RNA different from DNA?

DNA	RNA
<ul style="list-style-type: none"> • Double Stranded • Adenine - Thymine • Cytosine - Guanine • Deoxyribose sugar 	<ul style="list-style-type: none"> • Single stranded • Adenine - <u>Uracil</u> (thymine is replaced by uracil) • Cytosine - Guanine • Ribose sugar
	

Three kinds of RNA involved in protein synthesis

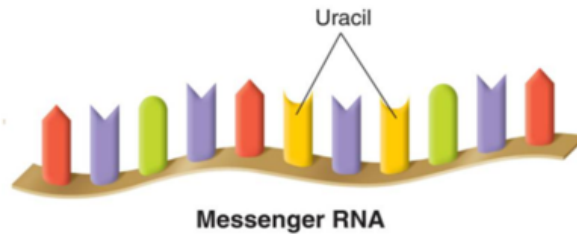
Ribosomal RNA(rRNA), the principle component of ribosomes.



Ribosome- cell organelle that makes proteins

Messenger RNA (mRNA)

Copy of the instructions for making proteins;
from the DNA



Transfer RNA (tRNA), carries
amino acids to ribosome

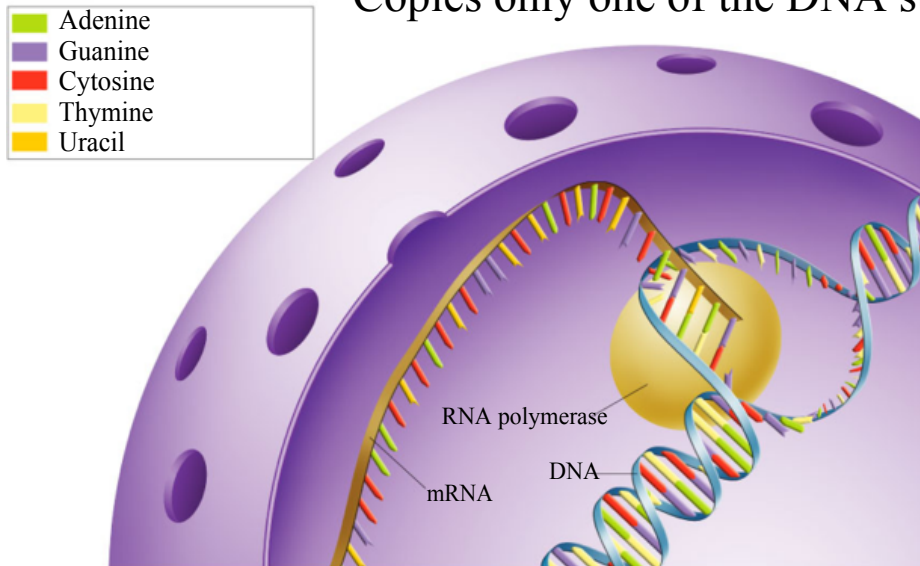


Step 1-Transcription

DNA is copied to RNA (mRNA)

Transcription occurs in the nucleus of the cell

Copies only one of the DNA strands.



Transcription rules

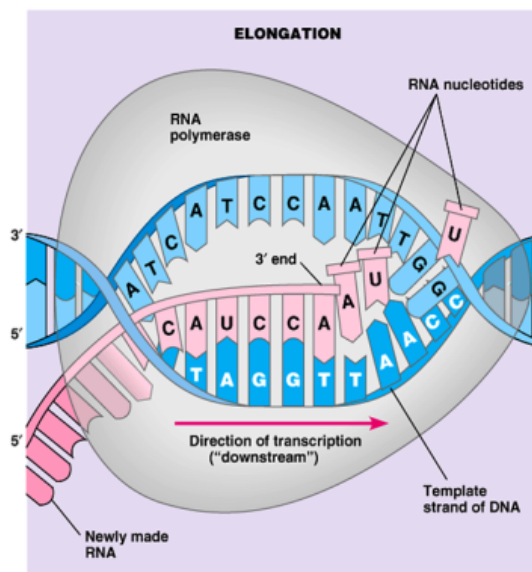
DNA to mRNA

A to U

T to A

C to G

G to C



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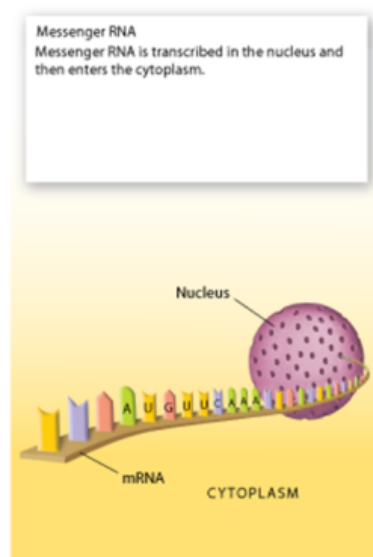
Let's Practice:

Transcribe the three DNA strands into mRNA on "Breaking the Code"

DNA #1 TAC CGG ATG CCA GAT CAA ATC

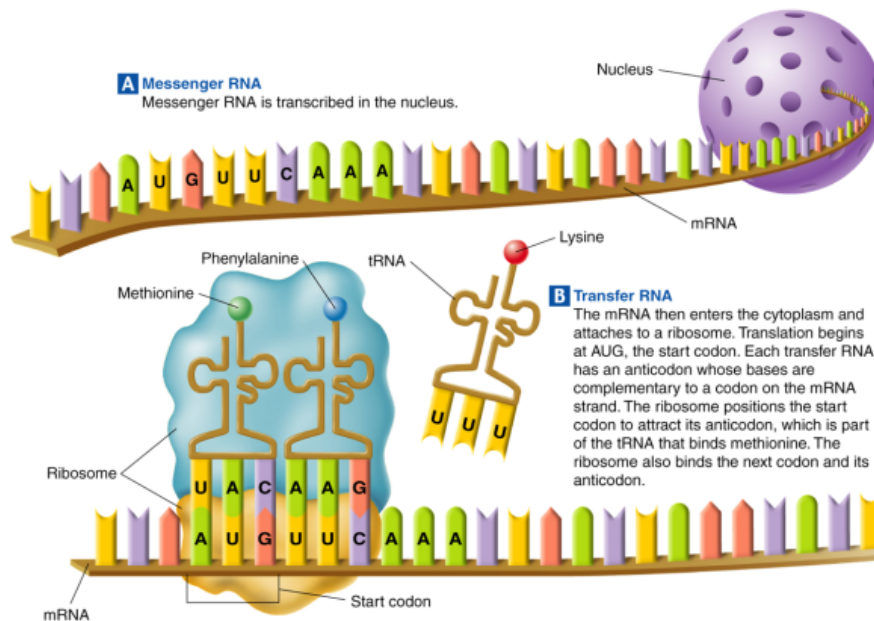
mRNA AUG

This molecule of mRNA then passes out of the nucleus and into the cytoplasm for the second stage



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Step 2: Translation: information from the mRNA is used to make proteins

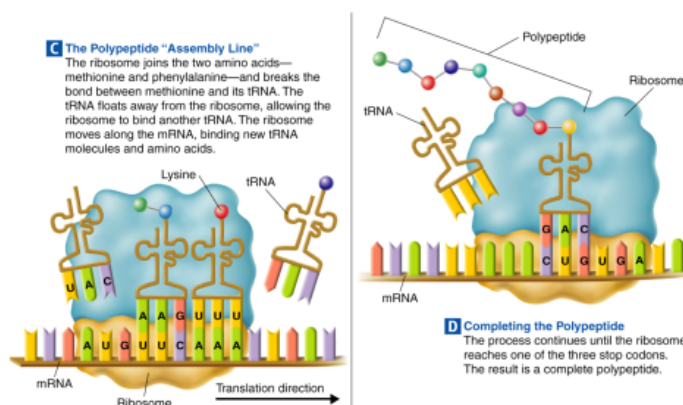


Every three nucleotides in mRNA specify a particular amino acid.

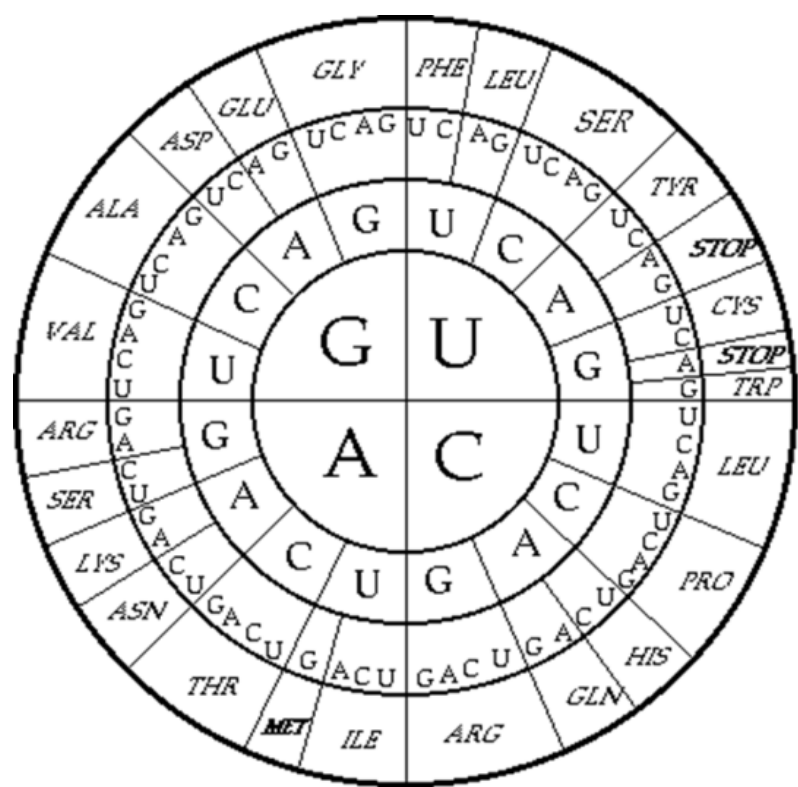
This nucleotide triplet is called a codon.

The order of bases in a codon determines an amino acid which in turn determines the protein.

Example: AUG= methionine



Circular Codon Chart

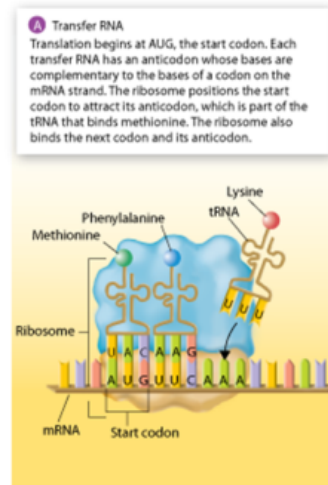


Rectangular Codon Chart

FIRST LETTER ↓	Second Letter				3rd Letter ↓
	U	C	A	G	
U	PHE	SER	TYR	CYS	U
	PHE	SER	TYR	CYS	C
	LEU	SER	STOP	STOP	A
	LEU	SER	STOP	TRY	G
C	LEU	PRO	HIS	ARG	U
	LEU	PRO	HIS	ARG	C
	LEU	PRO	GLN	ARG	A
	LEU	PRO	GLN	ARG	G
A	ISO	THR	ASN	SER	U
	ISO	THR	ASN	SER	C
	ISO	THR	LYS	ARG	A
	MET	THR	LYS	ARG	G
G	VAL	ALA	ASP	GLY	U
	VAL	ALA	ASP	GLY	C
	VAL	ALA	GLU	GLY	A
	VAL	ALA	GLU	GLY	G

The tRNA has an **anticodon**, which is a three nucleotide sequence, which are complementary to mRNA codons.

Amino acids are added to the growing protein chain until the stop codon is reached.



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